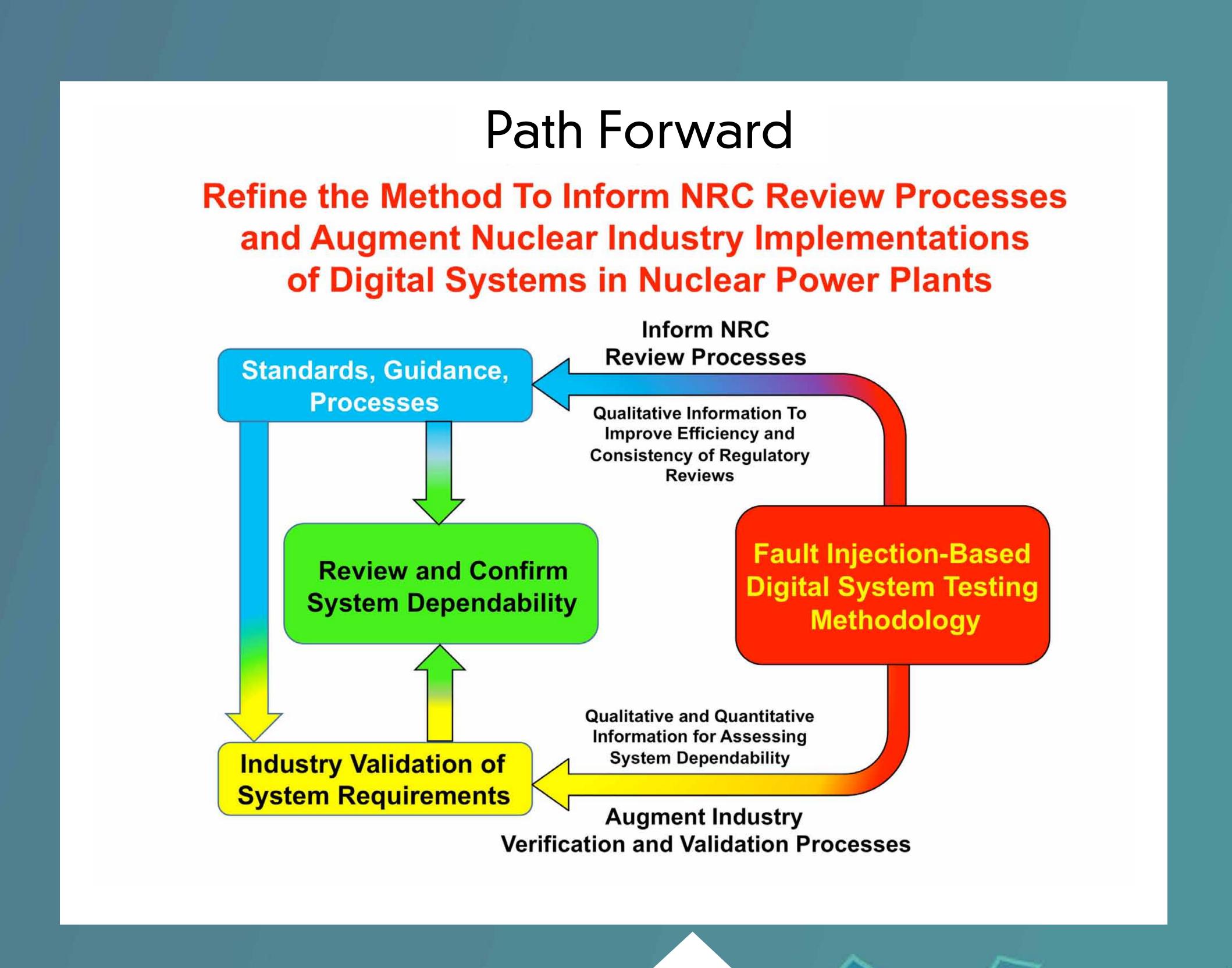


P (2011

Development of a Fault Injection-Based Test Methodology for Digital Systems

The overall safety and reliability of critical digital instrumentation and control (I&C) systems strongly depends on the use of FDIM (Fault Detection, Isolation, Mitigation) and online diagnostic functions employed in the systems. These functions typically account for as much as 40 to 50 percent of the executable system software code. Operating experience obtained from system events and FDIM function responses to events could assist in validating the effectiveness of FDIM functions in the system software. However, software-based systems rarely exercise imbedded FDIM code because faults and failures occur infrequently resulting in very little operating experience. Because of the lack of operating experience, FDIM code can only be effectively validated by realistic fault injection campaigns. NRC Digital System Research Roadmap **NRC Digital System Research Roadmap** **Pault Space** **How Systems Fail** **Detected and Popular Systems** **Pault Tolerance** **Pault Tolerance**



Assess the fault tolerance of critical system safety functions Determine the effectiveness of fault handling mechanisms Introduce artificial faults into the system Observe responses Determine adequacy of the obtained responses Generate more accurate estimates for dependability model parameters Fault coverage Fault latency times Reconfiguration times System failure mode response data Target Systems in Lab

